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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/819,969	03/28/2001	Masaki Ohya	14458	4222

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EXAMINER	
RODRIGUEZ, ARMANDO	
ART UNIT	**PAPER NUMBER**
2828	

DATE MAILED: 11/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/819,969	OHYA ET AL.	
	Examiner	Art Unit	
	Armando Rodriguez	2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

P riod for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 September 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,11 and 12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,11 and 12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

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Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1-8,11,12 have been considered but are moot in view of the new ground(s) of rejection.

Regarding the Double Patenting issue of claims 1 and 13, in accordance with applicant's amendment the double patenting has been withdrawn.

Regarding the 35 USC 112 rejection of claims 2,4,6,8 and 12, in accordance with applicant's arguments on pages 5 and 6 the rejection is withdrawn.

Regarding applicant's arguments on page 7, pertaining to the new and unexpected results, which directs the examiners attention to page 6, line 16, to page 8 line 2. As understood by the examiner page 6, discloses a requirement of having five or more well layers and a cladding layer thickness of at least 300nm will provide a small difference in the refractive index. However, claim 2 does not recite the thickness of the cladding but is capable of obtaining a small change in refractive index. Therefore, any structure having five or more well layers and a cladding layer thickness of at least 300nm will provide a small difference in the refractive index.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2,4,6,8 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 2,

It is not clear within the claim language, how the small difference in refractive index is obtained.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-8,11,12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwamoto et al (PN 6,487,226) in view of Nakatsu et al (PN 6,265,732) and Honda et al (PN 5,586,136).

Regarding claims 1,11,

Iwamoto et al discloses a improving the emission efficiency of a semiconductor laser by improving the heterojunction barrier between the active region and cladding layers.

Figure 1 illustrates a semiconductor laser having a cladding layer (2), an active layer (4) with quantum well layers (4a), a cladding layer (6) and a current blocking layer (9). Column 5 line 25 describes the active layer as having three to seven quantum well layers (4a). Column 5 lines 24-25 describe the cladding layer (6) as having a thickness of 0.3 *u*m. Cladding (6) which has a current blocking structure on the flat portion is described in column 5 lines 9-10 as having an impurity concentration of 1X10E18cmE-3.

Iwamoto et al does not disclose the cladding layer with a current blocking structure on the flat portion as having a carrier density in the range of at least 1X10E17cmE-3 and no greater than 5X10E17cmE-3.

Nakatsu et al discloses a semiconductor laser diode with improved light output by improving carrier confinement.

Figure 10 A illustrates a low carrier concentration of $3X10^{17}cm^{-3}$ will improve light output of the laser diode. In column 14 lines 44-60 describes the cladding layer (105) composed of layers (53) and (54) each having concentrations of $2X10^{17}cm^{-3}$ and $5X10^{17}cm^{-3}$, respectively.

Therefore, it would have been obvious to a person having ordinary skill in the art to adjust the carrier concentration of the cladding in the laser of Iwamoto et al laser device, to a low carrier concentration as taught by Nakatsu et al because it would improve the emission efficiency of the laser device.

Regarding claims 2,12

Iwamoto et al discloses a improving the emission efficiency of a semiconductor laser by improving the heterojunction barrier between the active region and cladding layers.

Figure 1 illustrates a semiconductor laser having a cladding layer (2), an active layer (4) with quantum well layers (4a), a cladding layer (6) and a current blocking layer (9). Column 5 line 25 describes the active layer as having three to seven quantum well layers (4a). Column 5 lines 24-25 describe the cladding layer (6) as having a thickness of 0.3 *u*m. Cladding (6) which has a current blocking structure on the flat portion is

described in column 5 lines 9-10 as having an impurity concentration of 1X10E18cmE-3.

Iwamoto et al does not disclose the cladding layer with a current blocking structure on the flat portion as having a carrier density in the range of at least 1X10E17cmE-3 and no greater than 5X10E17cmE-3.

Nakatsu et al discloses a semiconductor laser diode with improved light output by improving carrier confinement.

Figure 10 A illustrates a low carrier concentration of $3X10^{17}cm^{-3}$ will improve light output of the laser diode. In column 14 lines 44-60 describes the cladding layer (105) composed of layers (53) and (54) each having concentrations of $2X10^{17}cm^{-3}$ and $5X10^{17}cm^{-3}$, respectively.

Iwamoto et al and Nakatsu et al do not disclose a refractive index difference of at least $7X10^{-4}$ and no greater than $3X10^{-3}$.

Tanaka et al discloses a semiconductor laser with increased output emission.

In column 4 lines 1-68 and column 5 lines 1-4, Tanaka et al discloses controlling the refractive index below the ridge stripe to within a range of 8X10E-4 to 5X10E-3 by maintaining the thickness of the upper cladding layer, where no ridge is formed, to within the range of 0.2 to 0.6 *u*m, which contributes along with other parameters to an efficient output emission.

Therefore, it would have been obvious to a person having ordinary skill in the art to adjust the thickness of the upper cladding layer of the laser of Iwamoto et al as described by Tanaka et al because it would provide an efficient output emission.

Regarding claims 3 and 4,

Iwamoto et al does disclose the cladding layer composed of AlGaInP, see column 11 lines 62-67.

Regarding claims 5-8,

Iwamoto et al illustrates in figure 1 a semiconductor laser having a cladding layer (2), an active layer (4) with quantum well layers (4a), a cladding layer (6) and a current blocking layer (9). Column 5 line 25 describes the active layer as having three to seven quantum well layers (4a). Column 5 lines 24-25 describe the cladding layer (6) as having a thickness of 0.3 *u*m. Cladding (6) which has a current blocking structure on the flat portion is described in column 5 lines 9-10 as having an impurity concentration of 1X10E18cmE-3.

Iwamoto et al does not disclose the semiconductor laser having a misorientation of 5 degrees or more and compressively strained quantum well layers.

Honda et al discloses misorientation of 9 degrees to 17 degrees of the substrate plane of (001) to [110], which will improve the operating characteristics of the laser, as described in column 17 lines 6-44. In column 2 lines 56-65 described the quantum well layers as having a compressive strain.

On page 12 lines 25-28 of the specification applicant discloses and implies that the misorientation of the semiconductor laser is not critical to the claimed invention since the claimed invention is capable of operation regardless of the orientation.

However, it would have been obvious at the time the invention was made to provide a misorientation and compressive strain to the semiconductor laser of Iwamoto

et al because it would improve the operating characteristics of the semiconductor laser as suggested by Honda et al in column 17 lines 6-10.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Armando Rodriguez whose telephone number is (703) 308-6218. The examiner can normally be reached on 10-hour day / M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on (703) 308-3098. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-4881.

Armando Rodriguez
Examiner
Art Unit 2828

Paul Ip
Supervisor
Art Unit 2828

AR/PI